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(c) evaluating a performance characteristic of the deposition apparatus based on the detected signals

wherein the sensing element optionally comprises the substrate.

2. A method according to claim 1 wherein the electrical signals result from the droplets imparting an electrical stimulus to the sensing element.

3. A method according to claim 1 wherein a performance characteristic of the deposition unit is evaluated.

4. A method according to claim 1 additionally comprising:

when after the dispensing of some droplets onto the substrate an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance, then the source of the error is corrected prior to dispensing of other of the droplets onto that same substrate or the deposition apparatus is operated so as to compensate for the error during dispensing of other of the droplets onto that same substrate.

5. A method according to claim 4 wherein the error is detected after the dispensing of some of the droplets for an array, and the source of the error is corrected prior to dispensing of other of the droplets for the same array or the deposition apparatus is operated so as to compensate for the error during dispensing of other of the droplets for the same array.

6. A method according to claim 4 wherein:

multiple arrays are fabricated on the same substrate; and

wherein the error is detected after the dispensing of droplets for at least one of the arrays on the same substrate, and the source of the error is corrected prior to dispensing of droplets for other of the arrays on the same substrate or the deposition apparatus is operated so as to compensate for the error during dispensing of droplets for the same array or other of the arrays on the same substrate.

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7. (AMENDED) A method according to claim 1 additionally comprising changing biopolymers or biopolymer precursors in the dispenser unit to different biopolymers or biopolymer precursors, wherein the detection and evaluation are performed after the changing and before a dispensing of any droplets for an array.

8. A method according to claim 1 wherein an array is rejected based on the evaluated performance characteristic.

9. A method according to claim 4 wherein the dispenser unit comprises a pulse jet which ejects a droplet in response to a signal and which can de-prime, and the error is corrected by re-priming the pulse jet.

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10. (AMENDED) A method according to claim 1, additionally comprising when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance, identifying one or more features on the array which are defective as a result of the error.

11. (AMENDED) A method according to claim 10 additionally comprising communicating an identity of the identified defective features to a remote location or saving such information onto a storage medium.

12. A method according to claim 10 wherein the tolerance is 0.

13. A method according to claim 1 wherein:

the dispenser unit comprises one or more pulse jets which eject a droplet in response to a signal which require priming; and

the evaluated performance characteristic is whether one or more of the pulse jets are primed prior to dispensing any droplets for an array.

14. A method according to claim 13 additionally comprising, when an error is detected in which at least one of the pulse jets is not primed, then firing the pulse jet one or more times until the detected electrical signals indicate the pulse jet is primed.

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15. (AMENDED) A method according to claim 1 wherein:

the dispenser unit is repeatedly scanned across the substrate while dispensing droplets so as to fabricate the array;

the sensing element is struck by droplets so as to generate electrical signals when the dispenser unit passes beyond the array being fabricated on multiple scans during fabrication of the array.

16. (AMENDED) A method according to claim 15 wherein the sensing element is struck by droplets so as to generate electrical signals when the dispenser unit passes beyond the array being fabricated on each of multiple scans during fabrication of the array.

17. A method according to claim 1 wherein the sensor comprises the substrate.

18. A method according to claim 1 wherein the evaluated performance characteristic is the size of droplets dispensed from the dispenser unit.

19. A method according to claim 1 wherein the evaluated performance characteristic is the velocity of droplets dispensed from the drop dispenser unit.

20. A method according to claim 19 wherein droplet velocity is evaluated based on the difference in time between when the dispenser unit was activated to dispense a droplet and the time when the resulting signal is detected.

21. A method according to claim 19 additionally comprising dispensing multiple droplets from the dispenser unit at each of at least two different distances from the sensor, and wherein droplet velocity is evaluated based on the phase difference between the detected signal from multiple droplets at each distance.

22. A method according to claim 1 wherein the performance characteristic evaluated comprises the placement of droplets by the dispenser unit.

23. A method according to claim 22 wherein the placement of droplets is evaluated from the relative positions of the dispenser unit and the sensing element when a series of droplets dispensed at different relative positions of the dispenser unit and sensing element begin or cease striking the sensing element.

24. A method according to claim 23 wherein:

the sensing element has an insensitive region intermediate sensitive regions such that a signal is not generated by the sensing element when a dispensed droplet becomes co-incident with the insensitive region; and

the placement of droplets is evaluated from the relative positions of the drop dispenser unit and the sensing element when a series of droplets dispensed at different relative positions of the drop dispenser unit and sensing element begin or cease striking the sensing element at a region about the insensitive region.

25. A method according to claim 24 wherein the insensitive region is an opening in the sensing element.

26. A drop deposition apparatus for fabricating at least one addressable array of biopolymers on a substrate, comprising:

(a) a drop dispensing unit having:

at least six dispensers each of which can deposit droplets carrying the biopolymers or biopolymer precursors onto different addresses on the substrate so as to fabricate the array;

at least six reservoirs communicating with respective dispensers such that the dispensing unit can be simultaneously loaded with, and dispense between loadings, at least six different biopolymers or biopolymer precursors;

(b) a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element.

27. An apparatus according to claim 26 wherein the sensing element and amplifier detect electrical signals resulting from the droplets imparting an electrical stimulus to the sensing element.

28. An apparatus for fabricating at least one addressable array of biopolymers on a substrate, comprising:

(a) a drop dispensing unit which can deposit droplets carrying the biopolymers or biopolymer precursors onto different addresses on the substrate so as to fabricate the array;

(b) a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element;

(c) a processor which:

causes the drop dispensing unit to dispense droplets toward the sensing element after the dispensing of some droplets onto the substrate and evaluates a performance characteristic of the dispensing unit based on the resulting detected signals; and

when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance then the processor, prior to causing the drop dispenser to dispense droplets onto that same substrate, activates an operator alert or operates the apparatus so as to correct for the error before, or compensate for the error during, dispensing of other of the droplets onto that same substrate.

29. An apparatus according to claim 28 wherein:

the processor causes the drop dispensing unit to dispense droplets toward the sensing element after dispensing of some droplets for an array; and

when the error is detected the processor activates the operator alert or operates the apparatus so as to correct for the error before, or compensate for the error during, dispensing of the other droplets for that same array.

30. (AMENDED) An apparatus according to claim 4 wherein:

the processor causes the drop dispensing unit to dispense droplets so as to form multiple arrays on the same substrate, and to dispense droplets toward the

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sensing element after dispensing some of the droplets for the arrays on the same substrate;

when the error is detected the processor operates the apparatus so as to correct for the error before, or compensate for the error during, dispensing of the other droplets for other of the arrays on the same substrate.

31. (AMENDED) An apparatus for fabricating at least one addressable array of biopolymers with multiple features on a substrate, comprising:

(a) a drop dispensing unit which can deposit droplets carrying the biopolymers or biopolymer precursors onto different addresses on the substrate so as to fabricate the array;

(b) a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element;

(c) a processor which:

causes the drop dispensing unit to dispense droplets toward the sensing element after the dispensing of some droplets onto the substrate and evaluates a performance characteristic of the apparatus based on the resulting detected signals; and

when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance, identifies one or more features on the array which are defective as a result of the error.

32. (AMENDED) An apparatus according to claim 31 wherein the processor additionally communicates an identity of the identified defective features to a remote location or saves such information onto a storage medium.

33. (AMENDED) A method according to claim 31 wherein the tolerance is 0.

34. An apparatus for fabricating at least one addressable array of biopolymers on a substrate, comprising:

(a) a substrate holder onto which the substrate may be mounted;

(b) a drop dispensing unit which can deposit droplets carrying the biopolymers or biopolymer precursors onto different addresses on the mounted substrate so as to fabricate the array;

(c) a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element, wherein the sensing element comprises the substrate holder such that dispensed droplets striking a mounted substrate generated the electrical signals which are conveyed through at least part of the substrate holder;

(d) a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus based on the resulting detected signals.

36. An apparatus for fabricating at least one addressable array of biopolymers on a substrate, comprising:

(a) a drop dispensing unit which can deposit droplets carrying the biopolymers or biopolymer precursors onto different addresses on the mounted substrate so as to fabricate the array;

(b) a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element;

(c) a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and which evaluates a performance characteristic of the apparatus based on the resulting detected signals, wherein the evaluated performance characteristic is the velocity or placement of droplets.

37. An apparatus according to claim 36 wherein the processor evaluates droplet velocity based on the difference in time between when the dispenser unit was activated to dispense a droplet and the time when the resulting signal is detected.

38. An apparatus according to claim 36 wherein the processor causes the dispenser unit to dispense multiple droplets at each of at least two different distances from the sensor, and wherein droplet velocity is evaluated based on the phase difference between the detected signal from multiple droplets at each distance.

39. An apparatus according to claim 36 wherein the processor causes the dispenser unit to dispense a series of droplets at different relative positions of the dispenser unit and the sensing element, and evaluates the placement of droplets from the relative positions of the dispenser unit and the sensing element when the droplet series begins or ceases striking the sensing element.

40. An apparatus according to claim 36 wherein:

the sensing element has an insensitive region intermediate sensitive regions such that a signal is not generated by the sensing element when a dispensed droplet becomes co-incident with the insensitive region but is generated when a dispensed droplet strikes any of the sensitive regions; and

the processor causes the dispenser unit to dispense s series of droplets at different relative positions of the dispenser unit and the sensing element, and evaluates the placement of droplets from the relative positions of the drop dispenser unit and the sensing element when the droplet series begins or ceases striking the sensing element at a region about the insensitive region.

41. An apparatus according to claim 40 wherein the insensitive region is an opening in the sensing element.

42. An apparatus according to claim 40 wherein the insensitive region is a gap between sensitive regions in the form of linear conductors.

43. A computer program product comprising a computer readable storage medium carrying computer readable program code, for use with an apparatus for fabricating an array of features which apparatus includes a drop deposition unit and a sensing element, the program code when loaded into the computer performing the steps of:

(a) for each of multiple addresses, dispensing droplets carrying the biopolymers or biopolymer precursors from a drop dispensing unit onto the substrate, so as to fabricate the array;

(b) detecting electrical signals resulting from dispensed droplets striking a sensing element during step (a);

(c) evaluating a performance characteristic of the apparatus based on the detected signals; and

(d) when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance then, prior to causing the drop dispenser to dispense droplets onto that same substrate, activating an operator alert or operating the apparatus so as to correct for the error before, or compensate for the error during, dispensing of other of the droplets onto that same substrate.

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44. (AMENDED) A computer program product comprising a computer readable storage medium carrying computer readable program code, for use with an apparatus for fabricating an array of features which apparatus includes a drop deposition unit and a sensing element, the program code when loaded into the computer performing the steps of:

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(a) for each of multiple addresses, dispensing droplets carrying the biopolymers or biopolymer precursors from a drop dispensing unit onto the substrate, so as to fabricate the array;

(b) dispensing droplets toward the sensing element after the dispensing of some droplets onto the substrate;

(b) detecting electrical signals resulting from dispensed droplets striking a sensing element during step (b);

(c) evaluating a performance characteristic of the apparatus based on the detected signals; and

(d) when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance, identifying one or more features on the array which are defective as a result of the error.
